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REMARKS

The examiner stated that the title of the invention is not descriptive, and requested that a new title, indicative of the invention to which the claims are directed, be provided.

In response, applicant amended the title to "Surface-Mountable Radiation Emitting Component." Applicant notes that independent claim 1 and its dependent claims are directed to "[a] surface-mountable radiation-emitting component." Thus, applicant considers the amended title to be indicative of the subject matter to which the claims are directed.

Applicant amended independent claim 1 to include the feature recited in claim 3 that the first predetermined angle has a value lying in the range of 0-20 degrees, to include the feature appearing in claim 4 that the second predetermined angle has a value lying in the range of 70-90 degrees, and to include the feature appearing in claim 12 that the molding material has a curved surface in the main emission direction. Additionally, applicant cancelled claim 3. After these amendments claims 1-2 and 4-86 are pending. Independent claim 1 and claims 2, 7, 14 and 15 are presented for examination.

The examiner rejected claims 1-3, 7, 14 and 15 under 35 U.S.C. §102 as being anticipated by several references, including Japan Patent No. 311269, Japan Patent No. 57-169281 to Shunichi, Japan Patent No. 07-169893 to Eiji, U.S. Patent No. 5,942,770 to Ishinaga, U.S. Patent No. 6,432,745 to Waitl et al., U.S. Patent No. 5,981,979 to Brunner, U.S. Patent No. 5,035,483 to Waitl et al., U.S. Patent No. 6,006,861 to Hohn, and U.S. Patent No. 6,576,930 to Reeh et al.

Applicant's independent claim 1 describes a surface-mountable radiation emitting component that includes "a leadframe and a radiation-emitting chip mounted on said leadframe, a molding material encasing said leadframe and said radiation-emitting chip and having a shape defining a mounting surface of the component, said mounting surface extending at a first predetermined angle having a value lying within a range from 0° to 20° relative to a main emission direction of the component, said molding material having a shape defining a curved surface in the main emission direction, and said leadframe having leadframe connections protruding out of said molding material and having connection surfaces enclosing a second predetermined angle having a value lying within a range from 70° to 90° with said mounting surface."

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Thus, applicant's component has a molded encasing that has a mounting surface (i.e., the surface that is subsequently mounted on a target surface) that extends at an angle of 0-20° with respect to the main emission direction. In other words, the mounting surface of applicant's component is approximately parallel to the emission direction of the component, or slightly skewed (up to 20 degrees) with respect to the main emission direction, thereby facilitating substantially single-direction emission. This design facilitates sideways illumination of the target surface on which applicant's component is mounted.

The molded encasing of applicant's component also has a curved surface in the main emission direction, thereby enabling applicant's component to create, in some embodiments, "a lens effect and hence focusing of the emitted radiation" (page 22, lines 4-5 of the originally filed application).

Applicant's component also includes a leadframe whose connections protrude from the sides of the molded encasing. The plane of the leadframe thus defines an angle of 70-90° with respect to the mounting surface of the molded encasing. As explained in the originally filed application, "[t]his design [of the leadframe] permits both economical manufacture of the leadframe, for example by punching out a metal sheet or of a foil without additional bends, and a very small space requirement of the component" (page 19, lines 20-23).

In contrast, none of the references cited by the examiner discloses applicant's component design as recited in independent claim 1.

Japan Patent No. 311269

Japan patent No. 311269 includes a cross-sectional schematic of a semiconductor component that includes the semiconductor body 2 placed inside a plastic encapsulation. Connection fingers 1 and 7 extend into the plastic encapsulation. Although the main direction of emission of the semiconductor component is not explicitly indicated, based on the schematic provided it appears that the main emission direction is in an upward direction relative to the top surface of the plastic encapsulation 8. Further, based on the schematic it also appears that the mounting surface is the bottom surface of the plastic encapsulation 8. Thus, under those circumstances, the mounting surface extends at substantially a 90° angle relative to the main direction of emission, and therefore the 311269 reference fails to disclose "said mounting surface extending at a first predetermined angle having a value lying within a range from 0° to 20°

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relative to a main emission direction of the component," as required by applicant's independent claim 1.

Additionally, nowhere does the 311269 reference describe that the plastic encapsulation 8 has a curved surface. Thus, the 311269 reference fails to disclose or suggest "said molding material having a shape defining a curved surface in the main emission direction," as required by applicant's independent claim 1.

Therefore, applicant's independent claim 1 is patentable over the 311269 reference.
Japan Patent No. 57-169281 to Shunichi

Shunichi discloses a component that includes a light emitting device 2 placed inside a resin mold (see schematic and Constitution). Fixed part 5, on which device 2 appears to be mounted, includes a projection (presumably part 6) that intercepts some of the light generated by device 2. Terminals 1 extend into the resin mold such that their flat surfaces are substantially parallel to the top and/or bottom surfaces of the resin mold. Although the main light emission direction of Shunichi's component is not indicated, applicant contends that in any event Shunichi fails to disclose the features of applicant's independent claim 1. If the main direction of emission is through the top surface of the resin mold, then under those circumstances the mounting surface (presumably the bottom surface of the resin mold) would extend at substantially a 90° angle relative to the main direction of emission, and therefore Shunichi would fail to disclose "said mounting surface extending at a first predetermined angle having a value lying within a range from 0° to 20° relative to a main emission direction of the component."

If, on the other hand, the main direction of emission is through one of the side surfaces of the resin mold, the mounting surface is still the bottom surface of the resin mold, and the surfaces of terminals 1 are therefore oriented substantially parallel to the mounting surface. Shunichi thus fails to disclose "said leadframe having leadframe connections protruding out of said molding material and having connection surfaces enclosing a second predetermined angle having a value lying within a range from 70° to 90° with said mounting surface," as required by applicant's independent claim 1.

Moreover, as clearly seen from the schematic, the resin mold does not have a curved surface, and thus Shunichi fails to disclose or suggest "said molding material having a shape

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defining a curved surface in the main emission direction," as required by applicant's independent claim 1.

Therefore, applicant's independent claim 1 is patentable over Shunichi.

Japan Patent No. 07-169893 to Eiji

Eiji discloses a device whose purpose is to reduce the area occupied on a substrate at the time of loading of the parts (Abstract). Eiji includes a simple schematic showing terminal pieces 3 and 4 having flat surfaces 3a and 4a that "are almost orthogonally crossing the bottom surface 1a of the resin sealing area in the manner that the lower surfaces 1a of the side end of the lead terminal pieces 3, 4 are almost in the same plane as the bottom surface 1a" (see Constitution section of the reference).

Although Eiji does not indicate in what direction light is emitted from device, applicant contends that regardless of the direction of emission Eiji's device does not disclose the features of applicant's component. Particularly, if emission of light is directed from the top unmarked surface of the resin sealing area 1, then the direction of emission would be substantially perpendicular to the mounting surface 1a, and thus under those circumstances Eiji would fail to disclose "said mounting surface extending at a first predetermined angle having a value lying within a range from 0° to 20° relative to a main emission direction of the component," as required by applicant's independent claim 1.

If, on the other hand, the main emission direction of Eiji's device is through the side surface shown in the schematic, and thus parallel to the bottom surface 1a, the direction of emission would therefore also be parallel to the plane of the terminal pieces 3 and 4 (which are said to be lying almost in the same plane as the bottom surface 1a). Accordingly, under those circumstances Eiji would fail to disclose at least the feature "said leadframe having leadframe connections protruding out of said molding material and having connection surfaces enclosing a second predetermined angle having a value lying within a range from 70° to 90° with said mounting surface," as required by applicant's independent claim 1.

Moreover, as clearly seen from the schematic, the resin sealing area 1 does not have a curved surface, and thus Eiji fails to disclose or suggest "said molding material having a shape defining a curved surface in the main emission direction," as required by applicant's independent claim 1.

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Applicant's independent claim 1 is therefore patentable over Eiji.

U.S. Patent No. 5,942,770 to Ishinaga

Ishinaga discloses a two-color LED chip component, with the terminal arranged so that side-surface light emission can be achieved by vertically mounting the insulating substrate (Abstract). As shown in the figures (including FIG. 1), the LED component 101 includes a resin molding 6 that protects the LED elements 2a and 2b and other elements (col. 3, lines 55-57). Terminals 7 are fitted on the left and right hand side of the substrate 1. Ishinaga further describes that when the LED component 101 is mounted to achieve side surface light emission, the component 101 is placed on one of the exposed sides of the substrate (FIG. 4, and col. 5, lines 6-21). Thus, the mounting surface of the component 101 is part of the insulating substrate and not the resin molding 6. Accordingly, Ishinaga does not describe or suggest "a molding material encasing said leadframe and said radiation-emitting chip and having a shape defining a mounting surface of the component, said mounting surface extending at a first predetermined angle having a value lying within a range from 0° to 20° relative to a main emission direction of the component," as required by applicant's independent claim 1.

Moreover, as clearly seen from the schematic, the resin molding 6 does not have a curved surface, and thus Ishinaga fails to disclose or suggest "said molding material having a shape defining a curved surface in the main emission direction," as required by applicant's independent claim 1.

Applicant's independent claim 1 is therefore patentable over Ishinaga.

U.S. Patent No. 6,432,745 to Waitl et al. (hereinafter Waitl '745)

Waitl '745 discloses a two-pole SMT miniature housing in a leadframe technique for a semiconductor component, whereby a semiconductor chip encapsulated in a housing is mounted on a leadframe part (col. 1, lines 12-16). Particularly, as shown in FIG. 1, a chip 1, such as a IRED, LED, or a photodiode, is encapsulated in the housing 2. The housing 2 is then mounted on a surface, such as surface board 5. But nowhere does Waitl '745 disclose that the housing has a curved surface, and certainly it does not disclose that the housing 2 has a curved surface in the main emission direction. Accordingly, Waitl '745 does not disclose or suggest "said molding material having a shape defining a curved surface in the main emission direction," as required by applicant's independent claim 1.

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Furthermore, as seen from the figures, the housing 2 does not have a curved surface, and thus Waitl '745 fails to disclose or suggest "said molding material having a shape defining a curved surface in the main emission direction," as required by applicant's independent claim 1.

Therefore, applicant's independent claim 1 is patentable over Waitl '745.

U.S. Patent No. 5,981,979 to Brunner

Brunner discloses a surface mountable radiation emitting semiconductor that includes an integrally constructed sheath of radiation permeable material (Abstract). As further described by Brunner:

The plastic sheath 1 also has two flattened housing surfaces which face one another and are located parallel to the optical axis 24 of the semiconductor body 2. One of the surfaces represents an intake surface 18 and the other represents a PCB (printed circuit board) bearing surface 14. The terminal leads 7, 8 protrude through the bottom surface 13 out of the plastic sheath 1 approximately centrally between these two flattened housing surfaces" (col. 5, line 61, to col. 6, line 1)

Thus, the electrical terminals in Brunner, which are different from applicant's leadframe, are substantially parallel to the mounting surface of the component (namely, bearing surface 14). Accordingly, Brunner does not disclose or suggest at least the feature "said leadframe having leadframe connections protruding out of said molding material and having connection surfaces enclosing a second predetermined angle having a value lying within a range from 70° to 90° with said mounting surface," as required by applicant's independent claim 1.

Applicant's claim 1 is therefore patentable over Brunner.

U.S. Patent No. 5,035,483 to Waitl et al. (hereinafter Waitl '483)

Waitl '483 describes a surface-mountable opto-component with at least one transmitter and/or receiver (Abstract). Particularly, an optical transducer 4 is applied to an electrical terminal 2, and is connected to electrical terminal 3 (FIG. 1 and col. 2, lines 22-26). Subsequently, the optical transducer and parts of the terminals 2 and 3 are coated or cast with plastic to form housing 5 (FIG. 1 and col. 2, lines 30-32). Waitl '483, however, does not disclose that any of the surfaces, including the surface at the main emission direction, is curved. To the contrary, the surfaces of the housing, as seen from FIGS. 1-6, are substantially flat, and in some embodiments the flat surface at the main emission direction includes a cavity 8 shaped as a reflector (col. 2, lines 43-44). Thus, Waitl '483 does not disclose or suggest "said molding

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material having a shape defining a curved surface shape in the main emission direction," as required by applicant's independent claim 1.

Therefore, applicant's independent claim 1 is patentable over Waitl '483.

U.S. Patent No. 6,006,861 to Hohn

Hohn describes a wavelength-converting casting composition (Abstract). Hohn further describes several embodiments in which such casting composition may be used in conjunction with a semiconductor body 1. For example, as shown in FIG. 1, a semiconductor component includes a semiconductor body 1 secured to a first electrical terminal 2, and joined to another electrical terminal 3 (col. 8, lines 1-6). The semiconductor body 1 and terminals 2 and 3 are then enclosed by a hardened wavelength-converting composition 5 (col. 8, lines 7-10). Hohn, however, does not explain how the component is mounted onto a target surface, and does not indicate what is the main emission direction of any of the described components. Hohn, therefore, does not describe "a molding material encasing said leadframe and said radiation-emitting chip and having a shape defining a mounting surface of the component, said mounting surface extending at a first predetermined angle having a value lying within a range from 0° to 20° relative to a main emission direction of the component," nor does it describe "said leadframe having leadframe connections protruding out of said molding material and having connection surfaces enclosing a second predetermined angle having lying within a range from 70° to 90° with said mounting surface," as required by independent claim 1.

Thus, applicant's independent claim 1 is patentable over Hohn.

U.S. Patent No. 6,576,930 to Reeh et al.

Reeh describes a light-radiating semiconductor component that has a radiation-emitting semiconductor body and a luminescence conversion element (Abstract). Like Hohn, Reeh also does not explain how the component is mounted onto a target surface, and does not indicate what is the main emission direction of any of the described components. Reeh, therefore, does not describe "a molding material encasing said leadframe and said radiation-emitting chip and having a shape defining a mounting surface of the component, said mounting surface extending at a first predetermined angle having a value lying within a range from 0° to 20° relative to a main emission direction of the component," nor does it describe "said leadframe having leadframe connections protruding out of said molding material and having connection surfaces

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enclosing a second predetermined angle having lying within a range from 70° to 90° with said mounting surface," as required by independent claim 1.

Applicant's independent claim is therefore patentable over Reeh.

Conclusions

For the foregoing reasons, applicant's independent claim 1 is patentable over the art cited by the examiner. Claims 2, 7, 14 and 15 depend from independent claim 1 and are therefore patentable for at least the same reasons as independent claim 1.

It is believed that all the rejections and/or objections raised by the examiner have been addressed.

All of the dependent claims are patentable for at least the reasons for which the claims on which they depend are patentable.

Canceled claims, if any, have been canceled without prejudice or disclaimer.

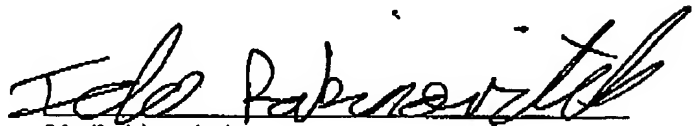
Any circumstance in which the applicant has (a) addressed certain comments of the examiner does not mean that the applicant concedes other comments of the examiner, (b) made arguments for the patentability of some claims does not mean that there are not other good reasons for patentability of those claims and other claims, or (c) amended or canceled a claim does not mean that the applicant concedes any of the examiner's positions with respect to that claim or other claims.

Enclosed is a Petition for One Month Extension of Time. Please apply the required fee of \$120, and any other charges, to deposit account 06-1050, referencing attorney docket 12406-120001.

Respectfully submitted,

Date:

Feb. 22, 2006



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